

The Patent Examiner has rejected claims 1 to 11 as being unpatentable over *Pirooz EP 701,275*. The Patent Examiner on page 4 of the Office Action has stated that the Applicants have argued that *Pirooz* teaches away from the claimed invention by interrupting the treatment sequence by rinsing with water or another treatment liquid. The Patent Examiner has stated that the treatment steps are not "interrupted" by this procedure and that the Applicants have failed to explain how this procedure interrupts the treatment steps.

In order to overcome this objection by the Patent Examiner, claim 1 is being amended in the manner proposed herewith as follows. The last paragraph in claim 1 is amended to cancel the objected-to terminology "interrupted" which appears therein and to utilize terminology that appears in the last paragraph of claim 11 which was added in the Amendment filed on July 31, 2000, in response to the First Office Action.

Therefore, claim 1 now recites the terminology "whereby these treatment steps form a treatment sequence B<sub>2</sub> which avoids the addition of fresh water or other liquids to the treatment baths". The Patent Examiner did not object to this language in claim 11. Support for this added terminology is found in page 2 in lines 13 to 18 of the present Specification.

Pirooz in column 3 in lines 8 to 13 discloses that after removal of the metals, the silicon wafers are rinsed for a period of at least about 0.1 minutes and typically about 2 to about 10 minutes in deionized water. The water preferably has a resistivity of about 3 to about 18 mega-Ohms, preferably greater than about 17 mega-Ohms.

Pirooz in column 3 in lines 35 to 41 discloses that if the ozonated bath is acid-free, the treated wafers may be immediately dried. If the ozonated bath contains hydrochloric acid or nitric acid, however, the treated wafers should be rinsed for a period of at least about 0.1 minutes and typically about 2 to about 10 minutes in deionized water having a resistivity of about 3 to about 18 mega-Ohms, preferably greater than about 17 mega-Ohms.

Pirooz in column 5 in lines 20 to 31 in the Example discloses the following seven steps:

1. 10 minutes in an SC-1 batch (1:10:50  $\text{NH}_4\text{OH}:\text{H}_2\text{O}_2:\text{H}_2\text{O}$ ) with megasonics at 70°C;
2. water rinse for 5 minutes;
3. 5 minutes in a metals removal solution (1:10:100  $\text{HF}:\text{HCl}:\text{H}_2\text{O}$ );
4. overflow water rinse for 5 minutes;
5. immersion in flowing ozonated water bath (14 ppm  $\text{O}_3$ ;

- metals each less than 0.01 ppb) for 5 minutes;
6. IPA (isopropylalcohol) dried for 10 minutes; and
  7. Processed through a rapid thermal annealer (750°C for 4 seconds) in a nitrogen atmosphere.

Concerning the reference *Pirooz, EP-701275*, *Pirooz* clearly leads away from the present invention. According to the Example discussed above in this reference, rinsing with water is performed in steps 2 and 4. Step 4 is between the treating step 3 with HF and step 5 with ozone, respectively. Accordingly, *Pirooz* suggests including rinsing with water in step 4 between two treatments with liquids other than water. Moreover, *Pirooz* does not disclose treating wafers with HF and ozone and HCl which is the claimed sequence of steps. According to *Pirooz* it would not be possible to perform these three claimed treatments with HF, ozone and HCl without a rinsing step with water in between. This is because *Pirooz* teaches that there must be these two water rinse steps 2 and 4 as a required part of the *Pirooz* method procedure.

Therefore, the conclusion that the *Pirooz* reference would lead in an obvious way to the claimed method comprising separate and subsequent treatment steps with HF, ozone and HCl containing liquids, and devoid of a water rinse step is respectfully

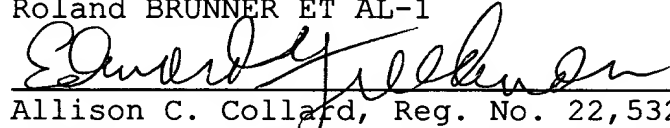
traversed, as believed to be in error.

In summary, claim 1 has been amended, and claims 1 to 9 and 11 are pending. Based upon these amendments, it is firmly believed that the present invention, and all the claims are now patentable under 35 U.S.C. 103, over the prior art applied by the Patent Examiner. A prompt notification of allowability is respectfully requested.

Respectfully submitted,

Roland BRUNNER ET AL-1

By:

  
Allison C. Collard, Reg. No. 22,532  
Edward R. Freedman, Reg. No. 26,048  
Attorneys for Applicant

COLLARD & ROE, P.C.  
1077 Northern Boulevard  
Roslyn, NY 11576  
(516) 365-9802

I hereby certify that this correspondence is being deposited with the U.S. Postal Service as first class mail in an envelope addressed to: Assistant Commissioner of Patents, Washington, D.C. 20231, on January 19, 2001.

  
Lisa L. Vulpis